

9.0

SHIPBOARD OPERATIONS - ENGINEERING

9.1 DUTIES AND RESPONSIBILITIES OF ENGINEERING DEPARTMENT

The Vessel Engineering Department, under the direction of the Chief Engineer, is responsible for the operation, repair and maintenance of all electrical and mechanical systems on board the vessel.

STANDING ORDERS - ENGINEERS

The Chief Engineer shall maintain a current copy of the Standing Orders in the Engine Control Room. Emergency instructions are referenced in the Vessel Emergency Response Plan.

The Chief Engineer is on call 24 hours a day and can be contacted via the internal phone system (509), 1JV system (104), by a messenger, and by UHF radio Ch.1.

The Chief Engineer shall be notified immediately in the case of any questionable situation, especially regarding any equipment that will compromise vessel integrity, maneuverability, or safety. When in question, contact the Chief.

The Chief Engineer is responsible for reporting to the Captain any situation that may cause problems with navigation and or the safety of the vessel. The Chief Engineer will keep the Captain notified of steps to correct the problem.

The Chief Engineer is responsible for tracking consumption of and ordering fuel, lube oil, and hydraulic oil. All other purchase orders or purchase requests will be filled out by the First Engineer and approved by the Chief.

I have read, understood, and will abide by the Engine Room Standing Orders set forth by the Chief Engineer.

 5/15/06
Chief Engineer

 5/15/06
First Engineer

 5/13/06
Second Engineer

 5/15/06
Third Engineer

 5/14/06
QMED

 5/15/06
Oiler

Maintenance

Chief Engineer

 5/22/06
First Engineer

 5/20/06
Second Engineer

 5-23-06
Third Engineer

 8-31-06
QMED

Oiler

Maintenance

American West Steamboat Company FLEET INSTRUCTIONS
Empress of the North

Date Issued: 06/06/04

Date Revised: 06/01/04

Approved By: Randy
Burns

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I have read, understood, and will abide by the Engine Room Standing Orders set forth by the Chief Engineer.

 11/05/06
Chief Engineer

 11/05/06
First Engineer

Second Engineer

 11/01/06
Third Engineer

QMED

 10/29/06
Oiler

Hotel Maintenance

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I have read, understood, and will abide by the Engine Room Standing Orders set forth by the Chief Engineer.

Chief Engineer

First Engineer

Second Engineer

 1/24/07
Third Engineer

QMED

Oiler

Hotel Maintenance

ENGINEERING STANDING ORDERS

9.1 Duties and Responsibilities of Personnel in Engine Department

9.1.1 FIRST ENGINEER

The First Engineer will stand the 0400-0800/1600-2000 watch and perform a four hour maintenance period from 0800-1200. (See watch rounds for proper round procedure). One round will be done each four hour watch period. Fuel oil will be transferred from designated storage tanks to day tanks as necessary. Air receivers will be blown down once a watch. General cleanliness and order will be maintained in the control room by the watch standing engineer. All PMP's that are completed will be signed off in the PMP log. All PSTP's that are completed will be signed off in the PSTP log. All completed jobs, including PMP's and PSTP's, will be accounted for and logged in the work log (see work log for proper procedures)

The First Engineer will be responsible for overseeing all maintenance done to the main generators. Oil samples will be taken at a 250 hour interval and sent in for analysis. All report results will be stored in the appropriate generator oil sample file. All hourly maintenance (ie...Oil changes, timing, valve lash adjustment) will be performed and recorded in both the generator log and the work log books.

The First Engineer will be responsible for all maintenance done on the 600V propulsion drive dc motors and the propulsion systems incorporated with each drive. Refer to PMP manual for proper maintenance schedules. Each propulsion motor will be meggered once a week and filed. A copy of the report will be given to the Chief each week. (See weekly meggering of dc motors for procedures)

The First Engineer will be in charge of assigning daily tasks to the watch standing and day working members of the engine department and to overseeing their completion. All watch standers and day workers will report directly to the First Engineer who is the first step in their chain of command. The Chief Engineer will be made aware of progress/changes/completion of the assigned tasks by the First Engineer.

The First Engineer will oversee that all rough logs (ie. Rough watch log/Work log/Generator log books/Water log books/Battery Log etc...) are filled out properly and updated accordingly. The work log will be used as a reference for entering machinery history into the AMDS program. The First will have the machinery history in AMDS updated before turnover to keep accurate logs on all machinery. The First will complete assigned PMP's and ensure that all due PMP's are completed by Eng. Department personnel, signed off, and recorded in the AMDS program. Hard copies will be stored for the year, then boxed up, labeled and sent ashore to the office.

The First Engineer will ensure that all Quarterly PSTP's are completed and signed off. Any deficiencies that are found will be corrected and appropriate notes will be made on Quarterly PSTP check off sheets.

The First Engineer will be responsible for keeping track of the inventories for both Engineering and Hotel Maintenance parts aboard the vessel. All ordering will be done by the First and approved by the Chief. (see inventory management and purchase orders for procedures).

The First Engineer will oversee all work orders, ensuring completion, proper recording in the AMDS program, and feedback to the appropriate departments are all followed. Hotel Maintenance will log work orders in the Hotel Maintenance Logbook while all other work orders will be logged in the work

log.

The First Engineer will be responsible for developing and maintaining a safety meeting logbook. All safety meeting topics will be recorded along with the date and the people who attended. There will be weekly safety meetings that discuss SMS topics or other safety topics selected by the First.

The First Engineer will oversee all maintenance for the refrigeration systems including both the ship's refrigeration system and the chilled water refrigeration system. This is to include all refrigeration box components, compressors for both systems, and electronics for both systems.

9.1.2 SECOND ENGINEER

The Second Engineer will stand the 0800-1200/2000-2400 watch and will perform a four hour maintenance period from 1200-1600. (See watch rounds for proper round procedure). One round will be done each four hour watch period. Fuel oil will be transferred from designated storage tanks to day tanks as necessary. Air receivers will be blown down once a watch. General cleanliness and order will be maintained in the control room by the watch standing engineer. All PMP's that are completed will be signed off in the PMP log. All PSTP's that are completed will be signed off in the PSTP log. All completed jobs, including PMP's and PSTP's, will be accounted for and logged in the work log (see work log for proper procedures)

The Second Engineer will be responsible for overseeing all maintenance for the potable water system including the pumps and chlorination system.

The Second Engineer will also be responsible for overseeing all maintenance for the sewage system. This is to include the Orca and Evac electronic systems as well as the mechanical systems (ie...transfer pumps, vacuum pumps, orca system pumps, etc.).

The Second Engineer will also oversee all Air Handler Units. This is to include both the 9 main AHU's as well as the each individual room AHU. Maintenance on these systems is to include proper interval for changing air filters, motor maintenance, and monitoring the set points for main air handler units.

The Second Engineer will oversee all maintenance for the sprinkler system. Daily checks will be made to ensure proper system pressure and inspection for leaks in the sprinkler tank room.

9.1.3 THIRD ENGINEER

The Third Engineer will stand the 0000-0400/1200-1600 watch and perform a four hour maintenance period from 1600-2000. (See watch rounds for proper round procedure). One round will be done each four hour watch period. Fuel oil will be transferred from designated storage tanks to day tanks as necessary. Air receivers will be blown down once a watch. General cleanliness and order will be maintained in the control room by the watch standing engineer. All PMP's that are completed will be signed off in the PMP log. All PSTP's that are completed will be signed off in the PSTP log. All completed jobs, including PMP's and PSTP's, will be accounted for and logged in the work log (see work log for proper procedures)

The Third Engineer will sound the fuel tanks at the beginning of each day (0000-0400) watch and then calculate the fuel consumption. This will be recorded in the smooth log. New soundings will be recorded on the white board for the day and updated daily.

The Third Engineer will oversee all maintenance for the air system. This includes PMP's for compressors and air system components such as regulators, air lubricators, and air horns/ship's whistles. This is also to include the Quarterly PSTP's for relief valves on pneumatic pressure tanks.

The Third Engineer will oversee maintenance on all pumps. This means acquiring the necessary parts to rebuild the pumps we have aboard, making sure that we have spares in our inventory.

The Third Engineer will oversee all maintenance on the watertight doors. This includes all PMP required tests/checks to be performed as well as the Quarterly PSTP checks. Refer to the watertight door manual for proper test procedures.

The Third Engineer will oversee all maintenance for the hydraulic systems aboard including the deck cranes, mast hydraulics, and bow ramp hydraulic systems. The Third Engineer will also be responsible for taking all oil samples at scheduled intervals. All results will be logged in respective files.

The Third Engineer will perform all battery maintenance and record all data in the battery log. The Third will inform the First on when it is necessary to order distilled water and new batteries.

9.1.4 QMED

The QMED will be a day worker with hours of 0600-1800. The QMED will be responsible for making daily rounds of all bar machinery. Cycle the ice machines once a day through the wash cycle. Refer to the ice machine manual for proper procedures. Once a month a bacteria test will be performed following CDC standards. Refer to CDC manual for proper procedure.

The QMED will report directly to the First Engineer and receive daily assigned tasks as well as a sanitary schedule for the Z-Drive room and the pump room. The QMED will also assist the other engineers with required maintenance and complete assigned PMP's. All PMP's that are completed will be signed off in the PMP log. All PSTP's that are completed will be signed off in the PSTP log. All completed jobs, including PMP's and PSTP's, will be accounted for and logged in the work log (see work log for proper procedures).

The QMED will be responsible for all water bunkering operations. Water will be bunkered when necessary and will be chlorinated as per CDC standards. It is the responsibility of the QMED to monitor the chlorinator while bunkering and test the far points daily. Chlorine charts will be given to the chief with the date, place bunkered, ph level, chlorine level, and the amount bunkered recorded on the circle chart. After bunkering water, the same information that is recorded on the circle chart will be recorded in the water log. The condition of the far point, which is taken daily, will also be recorded in the water log (ok or fail).

The QMED will keep a running inventory on chlorine, defoamer, and acid for the sewage drains and inform the First Engineer when they need to be ordered. Defoamer will be refilled in the dosing sump as necessary. The drains will be dosed with acid once a week including the toilets that are the farthest away in each zone, crew laundry drains, and passenger laundry drains.

The QMED will be responsible for overseeing that all air filters are changed when necessary and recorded in the air filter log. This includes all main AHU air filters, all house air filters, generator air filters, electric machinery air filters, etc. The QMED will be responsible for changing all water filters as necessary, this includes ice machine filters, soda machine filters, and chlorine filters in the galley and engine room. The QMED will also be responsible for changing all oil filters as necessary.

The QMED will be responsible for greasing the paddle wheel bearing as scheduled along with all bearings on "bearing grease schedule", valve stems, and reach rod universals.

9.1.5 OILER

The Oiler will be a day worker with hours of 0800-2000. The Oiler will make daily rounds of the engine room spaces including the generator flat, z-drive room, bow thruster room, pump room, and emergency generator room. This round will include monitoring the condition of the machinery in each space (ie. inspection for leaks from pumps or piping, general order in each space, and that tank levels are within range).

The intention of this round is to familiarize the Oiler with the location of shipboard equipment and for the Oiler to notify the watch standing engineers of discrepancies found.

The Oiler will report directly to the First Engineer and receive daily assigned tasks as well as a sanitary schedule for the generator flat, bow thruster room, and the emergency generator room. The Oiler will also assist the other engineers with required maintenance and complete assigned PMP's. All PMP's that are completed will be signed off in the PMP log. All PSTP's that are completed will be signed off in the PSTP log. All completed jobs, including PMP's and PSTP's, will be accounted for and logged in the work log (see work log for proper procedures).

The Oiler will assist the QMED with running hoses for bunkering water and the Engineers with the process of bunkering fuel. While assisting with bunkering fuel the Oiler will sound the fuel tanks and record soundings based on a time frame specified by the Chief. All of these soundings are to be recorded and given to the Chief after bunkering fuel has been completed.

The Oiler will be responsible for all strainers. All strainers will be cleaned at specified intervals including salt water, fuel oil, lube oil, and gear oil strainers. Refer to PMP manual for proper intervals and the manuals for proper cleaning procedures.

The Oiler will be responsible for keeping a running inventory on the engine room chemicals, cleaning, and safety equipment consumables. The Oiler will make the First aware of when it is necessary to order these consumables.

9.1.5 HOTEL MAINTENANCE

Hotel Maintenance will be a day worker with hours of 0900-2100. Hotel Maintenance will perform rounds of the hotel three times a day. Rounds will include looking for and repairing all deficiencies in public spaces. Be proactive and there will be less work orders generated.

Hotel Maintenance will report directly to the First Engineer and receive daily assigned tasks as well as a sanitary list. Hotel Maintenance will respond to work order requests filed at the purser's office and department work order boxes. Completed work orders will be properly filled out, logged in the hotel maintenance logbook, and put on the work order clipboard in the control room. When the request for a repair has been made by a passenger a note will be left in their room making them aware of the steps that have been taken to correct the deficiency.

Hotel Maintenance will assist the other engineers with required maintenance pertaining to the hotel and complete assigned PMP's. All PMP's that are completed will be signed off in the PMP log and recorded in the work log properly.

On turnover days, Hotel Maintenance will inspect every passenger room for deficiencies. This is done to catch deficiencies before the new cruise of passengers come aboard. Every room with passengers coming aboard must be done.

Hotel Maintenance will assist the QMED with the change out of the passenger and crew room air filters.

Hotel Maintenance will keep a running inventory of all hotel consumables. The First will be informed to order more when necessary.

9.2 ENGINE ROOM PROCEDURES

9.2.1 Rounds

Rounds will be conducted once a watch for watch standing engineers. Numbers will be taken on a rough log and transferred over to the smooth log. Be as neat as possible and sign off for the watch at the end of each watch.

Each "day working" member of the engine department will be responsible for making rounds. Each required round is described in the respective position's job description. Be thorough and attentive. As always, if you have questions, ask.

9.2.2 Watch Standing Running Log

The day starts at 0000 and ends at 2400. Where one day ends and the next begins, there will be a line skipped. The day's date will be written and highlighted. This makes it easier to distinguish between the dates.

Each engineer will write in the time his/her watch begins and give indication that they have assumed the watch followed with the initials of the individual assuming the watch. Every watch needs to be accounted for in this book, therefore, under normal circumstances you should have two entries per day stating that you are assuming the watch.

This is an event recording log book. This means all operational events that take place while on your watch shall be recorded in this book. This means every time the bow thruster is passed up to the bridge or received from the bridge, every time a generator is placed on line, every time fuel is taken, so on and so forth. When posting an entry be as clear and concise as possible. The time will be written next to each entry.

Every time fuel is taken an accurate account of fuel onboard will be recorded with initial soundings. After fueling, final soundings will be recorded and the amount of fuel bunkered on the DOI will also be recorded. The times for startup and finish bunkering will be recorded along with the place that fuel was bunkered. This is the same for water, dirty oil, or lube oil. All events need to be recorded in both the watch standing rough log and the smooth log in the same manner.

Every time ballast is added or discharged should be recorded. The initial amount in the tank, start time, final amount, and stop time should all be recorded.

Every safety meeting will be recorded in the watch standing log book. The time and topics will be recorded along with who attended. Every safety drill will also be recorded with a time, type of drill, and people from the engine department who attended. These entries will be made in red pen for both safety meetings and safety drills.

Every time steering gear is tested will be recorded in red pen. Refer to steering gear test for proper testing procedures. Steering gear should be tested ½ hour prior to departure.

Every time the emergency generator is run with load needs to be recorded in both the watch standing rough log and the smooth log in red pen. When it was started, when it was stopped, and at least one round of numbers taken from the EMCP off of the engine.

If a mistake is made while printing and entry into the rough log, it will be scratched out with a single horizontal line and initialed. There will be no white out or scribbling in the rough logbook.

9.2.3 Work Log

The work log will be used as a rough log to keep track of machinery history. Each day will start with the date highlighted. There will be a line skipped between days. This is to make it easy to distinguish between days. When recording an entry the initials of the recording individual will be put in the left hand margin. Be as descriptive of the problem at hand and the procedure used the remedy the situation. Fixed engine #3, is not acceptable. This will be used as a reference at a later date and a proper description of what was done needs to be recorded. When recording an entry about a piece of machinery that has running hours be sure to include the current hours in your entry.

9.2.4 Hotel Maintenance Log

This log will be used to keep track of what repairs are made within the hotel, work order items and round repaired items alike. Each day will start with the date highlighted. There will be a line skipped between days. This is to make it easy to distinguish between days. This log is to be filled out daily and all completed work orders are to be filed on the "Completed Work Orders" clipboard.

9.2.5 Potable Water Log and Bacteria Test Log

It is the responsibility of the QMED to monitor the chlorinator while bunkering and test the far points daily. After bunkering water the date, place bunkered, ph level, chlorine level, and the amount bunkered recorded in the potable water log by the QMED. The condition of the far point, which is taken daily, will also be recorded in the water log (ok or fail).

Bacteria will be tested for once a month at each bar by the QMED. Results from the test, where the test was taken, and the date the test was performed will be accounted for in the Bacteria Test Log.

9.2.6 Refrigerant Logbook

The Refrigerant logbook will be used to keep a record of the refrigerant added/recovered from all refrigeration machinery. The equipment that is being serviced, the amount added or recovered, the type of refrigerant, the person servicing the equipment, and the date will all be recorded in the refrigerant log.

9.2.6 Work Orders

Work orders need to be filled out properly by both engine department and the other departments aboard the boat. Be as descriptive as possible of the problem found and the repair that was performed. "Done" is not an acceptable explanation of "actions taken". These same forms that are used to generate work orders are used to send feedback to the other departments on the boat.

Blank work order forms need to be kept in the galley, each floor in the house keeper's mail boxes, and the purser's office. Work orders need to be checked and responded to numerous times a day by the hotel maintenance position in the same places as previously mentioned. Any work order that is beyond the scope of the hotel maintenance position needs to be given to the First Engineer to be handled properly. If you are unsure about what actions to take, ask questions.

9.2.7 Purchase Orders

Purchase orders will be filled out by the First Engineer and approved by the Chief Engineer. There will be three copies made of each approved purchase order. One will be stored in the purser's purchase order reference book, one in the engine room purchase order book, and one will be sent to the office. Purchase orders will be sent ashore once a week.

There are two sections to the engine room purchase order book, open and filled. Every time we receive stores the First Engineer will go through the items and check them off on the open purchase orders. Initials and date will be written down for each item that arrives. If an open purchase order has some items that have come in and some that have not, highlight the ones that have not come in. This purchase order will stay in the open section until all items have been filled. Once a purchase order has all items received it can then be moved to the filled section of the purchase order book.

Things that need to be ordered should be written on the "need to order" clipboard so the First Engineer can properly look up and order parts. If it something specific that you need then include the catalog, part number, and page number on the "need to order" list so the First Engineer can review it and include it on the next order.

9.2.8 Engine Room Inventory

Inventory on spare parts will be a running inventory. Inventory on consumables will be done on an order as needed basis.

Spare parts will be accounted for as they come in by updating the inventory, printing out proper labels, and storing in correct parts box in the z-drive room. As parts are used the labels will be removed and put in the First Engineer's used parts box. The First Engineer will then update the inventory and decide whether it is necessary to order more or if the inventory in stock is sufficient. A label will be printed out for every spare part that comes in and a label will be removed from the parts box for every part that is used in a repair.

It is the responsibility of all engine room personnel to adhere to this practice so that we are able to keep an accurate inventory and the necessary spare parts to make repairs. It is also the responsibility of everyone in the engine room to be aware of what consumables need to be ordered, and to make the First Engineer aware of the same. If we do not have something you need, it is because this practice is not being followed. Help each other out.

9.2.9 Lock Out / Tag Out

All electrical and mechanical equipment that is being secured and is not regularly turned on and off will be locked and tagged out. All locking out and unlocking of machinery will be recorded in the lock out / tag out book. The circuit number, panel number, equipment being locked out, the reason for the lockout, the person locking out or unlocking, and the date of locking or unlocking equipment will always be recorded. The current machinery that is locked out will always be posted on the 600 Volt switchboard panel with the lock out / tag out file book stored below it. As new are necessary, any equipment that is still locked out on old sheets will be highlighted. A sheet must have all items unlocked before it can be filed in the lock out / tag out book.

No one is to unlock machinery without finding out if it is safe to do so. Be sure when securing equipment that all power sources or possible energy sources have been secured. Always de-energize equipment while servicing it. If you are unsure of how to secure something, ask before you continue to work on it.

If you are scheduled for a turnover and the machinery that you have locked out has not been returned to service, a full explanation will be left in the turnover notes for your relief. The explanation should include why the machinery has been locked out, the progress made in the repair, and any future parts deliveries or contracted service repairs. A copy will be given to your relief and posted next to the lock out / tag out service station on the 600 volt switchboard so that everyone in the engine room is aware of the status while you are away.

9.2.10 Bilges

Bilges will be checked regularly and pumped into the oily water tank when necessary. The Oily Water Separator (OWS) will then be used to separate the oily water to an acceptable level to be pumped overboard <15 ppm, or the oily water tank will be pumped to an acceptable facility ashore.

Bilges may not be pumped overboard in an IMO identified "Special Area" as per MARPOL regulations. Call the Bridge before using the OWS to get the ship's position for starting and stopping operation of the OWS. The Bridge will let you know if we are in a "Special Area" and whether it is acceptable to operate the OWS or not.

Any time that the OWS is operated or if the oily water tank is pumped ashore to an acceptable facility it must be recorded in the rough log book, smooth log book, and the oil record book. The following information must be recorded in the rough and smooth log: the ship's location, the approximate amount pumped overboard or ashore, the time started and stopped, and the reception facility if applicable. Follow the instructions in the oil record book when logging the use of the OWS.

9.2.11 Steering Gear Test Procedures

Steering Gear will be tested at each control station ½ hour before every departure. The Bridge will call down to the Engine Room at least ½ hour before the steering gear test to announce when gear test and departure will be. This gives the diesel generators the proper amount of time to warm up and the engineer on watch the enough time to get the plant online. The plant will be online for ½ hour before we leave the dock to allow the propulsion motors enough time to warm up.

Steering gear test will consist of testing the full rotation of the steering gear in both directions (360 degrees clockwise / 360 degrees counterclockwise) for all propulsion drives with exception of the paddlewheel. A verbal check should be made over the phone to verify that EOS console and Bridge consoles are showing the same on the steering indicators. The propulsion motors will then be engaged to verify that throttle control is possible and tachometer readings are available. A verbal check should be made over the phone to verify that the EOS console and the Bridge consoles are showing the same tachometer readings. The EOS console, Bridge main console, and Bridge wing stations will all be tested in the same manner.

The bow thruster will be warmed up for at least five minutes before every transfer. Warming up the bow thruster consists of energizing the AC breaker and DC contacts for the propulsion motor as well as starting the steering pump remotely from the EOS console. A full steering gear test will be performed at the EOS console and at the Bridge main console. This will involve testing the full rotation of the steering gear in both directions (360 degrees clockwise / 360 degrees counterclockwise).

9.2.12 Emergency Stop

Normal operating procedure is to directly control the main engines from the Bridge. During an emergency situation, the engines may be controlled from the engine room. When controlling the engines from the engine room, the Engineer should have a means of communication with the Bridge. The 2JV system is the preferable system to be used.

Engineers will immediately inform the Bridge if it becomes necessary to stop the engines from the engine room. The Engineers will not stop the engines without permission from the Bridge in restricted waters. The Officer of the Watch in the Bridge must take appropriate action to prevent collision or grounding, which may include dropping the anchor or calling for assistance from other vessels.

9.2.13 Fire Precautions in Machinery Spaces

Machinery spaces will be inspected on a regular basis by the Chief Engineer to ensure that the spaces are in good order and do not present a safety hazard. Spills and leaks shall be cleaned up immediately. Combustible materials shall not be allowed to accumulate and shall be properly disposed of. Approved fire proof bins are provided for disposal of waste and rags. These bins must be emptied regularly.

9.3 FAMILIARIZATION OF NEW ENGINEERS

Engineers assigned to an American West Steamboat Company vessel must be completely familiar with:

- ▶ The general arrangement of the ship.
- ▶ Procedures, equipment and controls in machinery spaces.
- ▶ Location of operation of emergency systems.
- ▶ The Company's SMS and Engine Room standing orders.
- ▶ The procedures for transferring fuel

9.4 FUEL AND OIL TRANSFER

The **Empress of the North Oil Transfer Procedures Manual** meets the requirements of 33 CFR 155.720. This manual is to be reviewed, referred to and used each time the vessel conducts Oil Transfer operations including taking fuel, discharging oily bilges ashore or transferring fuel onboard the vessel.

Two copies of this Manual will be kept on-board, and updated with the latest revisions. One copy for the Chief Engineer and one copy for the Master. Office copy will be kept in the Main office.

Starting a Generator and Placing on Line

1. Verify that generator to be started is in "OFF" position on *Engine Control Switch*, located on the generator control board.
2. Check generator fluid levels: Lube oil, aftercooler expansion tank, jacketwater expansion tank.
3. On engine ECM place *Idle Selector Switch* in the "IDLE" position (pushed toward engine).
4. On the generator control board switch the *Engine Control Switch* to "MANUAL". The generator will start after a 30 second prelube.
5. Allow the generator to idle until the lube oil temperature reaches 150°F as indicated on the HMI screen for that generator.
6. Switch the *Idle Selector Switch* on the ECM to the "RUN" position (pulled away from the engine).
7. Verify that the generator voltage is 600V and the frequency is 60Hz.
8. Place key in *Synchroscope Switch* and turn to "ON" position.
9. Adjust the frequency using the *Speed Adjust Switch* until the generator is rotating slow in the fast direction or slow in the slow direction. (The switch is very sensitive and should not be adjusted more than necessary).
10. When the synchroscope needle is moving properly turn the *Breaker Control Switch* to the "CLOSE" position as the needle reaches the 12 o'clock position.
11. Verify that the generator is taking the load and turn the *Synchroscope Switch* to the "OFF" position.

Taking a Generator Offline and Shutting Down

1. Verify the position of the *Engine Control Switch* for the generator to be taken offline, if the switch is in the "AUTO" position it needs to be turned to "MANUAL".
2. With the *Engine Control Switch* in "MANUAL", turn the *Load Shed Switch* to the "SHED" position (the switch will be facing down in the SHED position).
3. Watch the generator Amps and KW begin to drop off as the load is shed. When the KW and Amps reach 0 or no longer remain dropping, turn the *Breaker Control Switch* to the "OPEN" position.
4. The breaker will open, reset the *Load Shed Switch* to its normal position (facing up).
5. Turn the *Engine Control Switch* to the "OFF" position. The generator will automatically go through a cooldown phase lasting 5 minutes and will then shutdown.

Running Two Generators in Parallel

1. Start the generators according to procedures and parallel.
2. On the master control panel move the *Load Select Switch* to the generator desired to be in the lead position.
3. Locate the *Power Management Screen* on the HMI (EOS Console) and verify the system status. "Power Management: Active" will be displayed if one generator's *Engine Control Switch* is in the "AUTO" position, "Power Management: Override" will be displayed if both generator's *Engine Control Switch*'s are in the "MANUAL" position. If "Power Management: Verifying" is displayed wait until either of the above "Active or Override" is displayed. The bottom corners of the screen should read "Stable".
4. If "Active" is displayed on the *Power Management Screen* the lead generator *Engine Control Switch* is in "AUTO". Verify that the second generator *Engine Control Switch* is in the "MANUAL" position. There will always be one generator run in the "MANUAL" position and one in the "AUTO" position.
5. If "Override" is displayed on the *Power Management Screen* both generators *Engine Control Switch*'s are in the "MANUAL" position. Move to the generator control board for the unit that is to be run in lead and that the *Load Select Switch* on the master control panel has been set for. Switch the *Engine Control Switch* to the "AUTO" position. Return to the HMI *Power Management Screen* and verify that the system has changed to "Active" and that the system is "Stable".
6. For the offline generator, turn the *Engine Control Switch* directly to "AUTO". This allows the generator to start and parallel itself in case of the loss of another generator or an overload on the two online generators.

Running Three Generators in Parallel

1. Follow the procedures for running two generators in parallel.
2. Start the third generator and parallel according to procedures.
3. Locate the *Power Management Screen* on the HMI (EOS Console) and verify the system status, it will read "Power Management: Override". There should be one generator in "AUTO" and two in "MANUAL". The system should read "Stable" on the *Power Management Screen*.
4. "Close" the *Port Z Drive* breaker.
5. "Close" the *Stbd Z Drive* breaker.
6. On the second generator to be run in "AUTO", switch the *Engine Control Switch* to the "AUTO" position.
7. Verify that the *Power Management Screen* reads "Power Management: Active" and that the system is stable. Two generators should be in "AUTO" and one in "MANUAL".

Testing Gear

1. Put generators online according to procedure, the bridge will notify the engine room at least 30 minutes prior to test gear time, the time of gear test and the number of engines to be placed online.
2. Close the *Port Z Drive*, *Stbd Z Drive*, *Jet Pump*, and *Paddle Wheel* motor breakers. Charge the springs after closing each breaker. (If three generators are online the port and stbd Z drive breakers will already be closed.)
3. The *SCR Control Board* is located in the upper center of the EOS console. With the breakers closed each SCR drive control should have the "READY" light illuminated. Push the "START" button for each SCR drive, when the SCR is energized the lamp in the "START" button will illuminate.
4. The *Steering Pump Control Board* is located in the far left corner of the EOS lower console. Push the "STEERING PUMP START" button for the *Jet Pump*. The green "Steering Pump Engerzied" light will illuminate.
5. The *Z Drive Steering Pump* controls are in "LOCAL" control and located centerline in the lower engine room. Push the "START" (black) button on the control panel. The green "run" lights on the motor control board and the green "Steering Pump Energized" lights on the EOS console will illuminate.
6. At this time the engine room has control of all propulsion on the vessel. Call the bridge on the 1JV at the time of test gear.
7. With the bridge ready to test gear, rotate the port and stbd Schottel-drive controls 360° , stopping every 90° . Verify that the drives are rotating and stopping on the console, verify that the bridge shows the same movement of the drives. When the drives have been rotated 360° to their starting position, rotate them the other direction 360° stopping every 90° .
8. When the rotation of the drives has been verified, depress the throttle pot on the control to the detent briefly. The tachometer should register an increase in RPM's for each drive, when the RPM is visually seen as increasing by the engineer and watch and bridge-return the throttle to zero.
9. Repeat steps 7 and 8 for the Jet Pump.
10. When all three drives have been tested by the engineer on watch, transfer control to the bridge from the *Take Over Control* console. The bridge must repeat steps 7 and 8 for all three drives, being visually verified on the EOS console.
11. The bridge is then to test the port and stbd *EOT* (engine order telegraph). A buzzer will sound and the LED will begin blinking indicating the order from the bridge. Push the button adjacent to the flashing LED to answer the order, the LED will stop flashing and remain lit. The bridge should go through all of the buttons and the directional order.
12. Testing gear has been completed, the vessel should get underway 30 minutes after the gear test.
13. Once the amperage starts to come up on the drive motors, seen on the EOS console, close *Harmonic Filter #1*, or *Harmonic Filter #2* and charge the breaker.

Finished With Engines

1. The bridge will call down to the EOS on the 1JV when they have finished with engines. They will send down the control of the engines through the *Take Over Control* console. Push the "TAKE OVER FROM BRIDGE" buttons for all three drives.
2. Verify that the Schottel controls for rotation and throttle on the EOS console match with the actual position of the drives. This is indicated by flashing green lights above each drive control indicating "RPM" and rotation. When the lights become steady the controls are aligned with the drives.
3. Push the "STOP" button for each drive on the *SCR Drive Control* console.
4. Push the "STOP" button for the *Jet Pump Steering* pump on the EOS console.
5. Go below to the Z drive steering pump controller and push the "STOP" button for the port and stbd Z drive steering pumps.
6. Push "OPEN" for the harmonic filter breaker that is on the bus.
7. Push "OPEN" for *PW Motor*, *Jet Pump Motor*, and *Port and Stbd Z Drive Motor* breakers.
8. Follow procedures for taking a generator offline for the generator in "MANUAL" on the *Engine Control Switch*.
9. If three generators are online, take the generator in manual off the bus according to procedures. The generator NOT in the lead position will take itself off the bus and shutdown automatically after 10 minutes online. It may remain in the "AUTO" position on the *Engine Control Switch*, once shutdown it will be the "Standby" generator.

Black Ship Startup

1. Start the emergency generator manually and put online according to procedures.
2. Switch *Air Compressor #1* and *Air Compressor #2* on and allow to run until the air receivers reach a pressure of 225 PSI.
3. Start main engine #1 or #2 according to the procedures.
4. Verify that the engine is running at rated speed and the generator is producing 600V at 60Hz. Close the bus breaker for the generator.
5. Follow the procedure for securing the Emergency Generator.

Emergency Steering Takeover Procedures

1. In the event of a steering failure immediately notify the bridge and the Chief Engineer. Remain in contact with the bridge on the 1JV.
2. Start the *Jet Pump* and transfer control to the bridge if not already done.
3. On the *Take Over Control* panel on the EOS console, flip up the glass protector and press the "EMERGENCY TAKEOVER" buttons for the Z drives.
4. Match the Port and Stbd Z drive thrust direction and throttle position so that the lights above the controls are solid green. Once matched bring throttle to zero position.
5. Turn the Z drives so that the thrust direction is inboard of each drive (needle is at 3 o'clock on Port and 9 o'clock on Stbd).
6. Engage the throttle to 400 RPM or what the bridge orders.
7. When ship is under control or stopped remain in contact with bridge using 2JV, a deck hand will come down to relieve the steering station in the EOS.

FFU Steering Failure

1. In the event of an "FFU Failure" alarm on *HMI Alarm Monitor* screen contact the bridge and verify that they have "NFU Steering". Notify the bridge that the drive will need to be reset to clear the alarm and regain control.
2. In each *Drive Control Cabinet* (Port/Stbd Z, Jet Pump) there is a row of breakers and cards. Red LEDS should be lit on the FFU cards for the drive in alarm. Manually "OPEN" the *FFU Steering* breaker and after a few seconds "CLOSE" the breaker again. The red LEDS should clear and turn green.
3. Verify that the alarm has cleared from the *HMI Alarm Monitor* and that the bridge has FFU steering.

Emergency Generator

After preliminary check list for generators

--RUNNING THE GENERATOR

- 1) On emergency switchboard, turn **ENGINE MODE SWITCH** to "OFF"
- 2) On engine control panel (ECP), turn **SELECTOR SWITCH** to "MAN/START" ; engine is running
- 3) When finished turn **SELECTOR SWITCH** to "COOLDOWN/STOP"
- 4) After engine has shutdown, turn **SELECTOR SWITCH** to "AUT/AUTO"
- 5) On emergency switchboard, turn engine **ENGINE MODE SWITCH** to "AUTO"
- 6) On emergency switchboard, "EMERGENCY GENERATOR IN AUTO" lamp should be lit

TESTING THE GENERATOR

- 1) Check to see that **ENGINE MODE SWITCH** is in "AUTO"
- 2) On emergency switchboard, "OPEN" **TO SHIP SERVICE PANEL P/EP-BT BREAKER**
- 3) Generator should start up
- 4) On emergency switchboard **EG01 BREAKER** should close, energizing the switchboard
- 5) On emergency switchboard, "EMERGENCY POWER AVAILABLE" & "CIRCUIT BRAKER CLOSED" lamps should be lit
- 6) If "CIRCUIT BRAKER OPEN" or "CIRCUIT BRAKER TRIPPED" lamps are lit, manually close **EG01 BREAKER**
- 7) When finished, turn **ENGINE MODE SWITCH** to "OFF"
- 8) Trip the **EMERGENCY GENERATOR CONTROL SWITCH**
- 9) **TO SHIP SERVICE PANEL P/EP-BT BREAKER** should be in the "ON" position, if breaker wont close, check that "bus tie to emergency SWBD P/EP-BT" breaker on the 480V switchboard in EOS is closed
- 10) On emergency switchboard, "MAIN BUS POWER AVAILABLE" lamp should be lit
- 11) On ECP turn **SELECTOR SWITCH** to "COOLDOWN/STOP"
- 12) After engine has shutdown, on ECP turn **SELECTOR SWITCH** to "AUT/AUTO"
- 13) On emergency switchboard, turn **ENGINE MODE SWITCH** to "AUTO"
- 14) On emergency switchboard, "EMERGENCY GENERATOR IN AUTO" lamp should be lit

***ANY TIME THE EMERGENCY GENERATOR IS BROUGHT ON LINE OR TAKEN OFFLINE,
EP407 BREAKER ON THE EMERGENCY SWITCHBOARD**

Ballasting

- 1) Check with bridge on draft readings
- 2) Ensure that the sea chest suction and overboard valves are open for the ballast pump
- 3) Turn ballast pump on/check that water is discharging overboard
- 4) Open "fill valve" for tank to be ballasted
- 5) Throttle overboard discharge valve shut slowly
- 6) Monitor TLI for ballast tank/**don't fill over 93%**
- 7) When desired level is reached, shut pump down, close "fill valve", and reopen overboard discharge

De-ballasting

- 1) Check with bridge on draft readings
- 2) Ensure that the sea chest suction and overboard valves are open for the ballast pump
- 3) Turn ballast pump on/check that water is discharging overboard
- 4) Open "tank discharge" valve for tank to be de-ballasted
- 5) Throttle sea chest suction valve shut slowly, monitoring gauge on suction side of pump
- 6) For pump to maintain prime during de-ballasting, the gauge should be reading at least 10-15 in hg
- 7) If pump loses prime, reopen sea chest suction to re-prime and throttle it shut again slowly
- 8) When de-ballasting is complete, shut pump down, close "tank discharge" valve, and reopen sea chest suction

Day Tanks

- 1) Open valves on "fuel suction" manifold for the bunker tanks being drawn from (stbd bunker, center bunker, port bunker)
- 2) Open valves on "fuel discharge" manifold for the day tanks
- 3) Open suction and discharge valves for whichever transfer pump will be used
- 4) Turn transfer pump on
- 5) Monitor fuel level on the TLI displays and on day tank sight glasses
- 6) **DON'T** fill past marks on the tank sight glasses/TLI's should never read above 90%
- 7) when finished, shut pump down and secure all valves

*if at any point during the transfer, "FO day tank level" alarm goes off, shut the transfer pump down immediately from the upper ER, EOS, or at the transfer station and check the overflow for the day tanks.

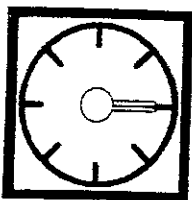
POTABLE WATER BUNKERING PROCEDURES

1. Remove potable hoses from hose locker on the forth deck starboard side aft.
2. Connect quick connect adapter to potable water bunker station.
3. String out hoses to potable water supply source.
4. Connect hose to supply source and insure all connections are elevated off the ground and deck of the ship.
5. Upon connection of all sections of hose begin to flush out hoses for several minutes and connect hoses to bunker station on deck.
6. Set up chlorination station by placing a new Honeywell Circular Chart in the chart recorder.
7. Set up chlorinator to keep bunkering Chlor level between 2.0 and 5.0 PPM.
8. Open supply valve and deck valve to begin taking on water.
9. Check calibration of Chlor dosing pump with manual test kit.
10. Insure the Chlor level does not exceed 5.0 PPM.
11. Periodically check Chlor level with manual test kit.
12. After tank is filled to the proper level secure all hoses and fittings in the designated storage locker making sure to cap the ends of the hoses or connecting them together to prevent entry of debris or foreign matter.
13. Remove chart and record start, stop, gallons bunkered and port of call on the back of the chart, file chart in potable water file in EOS and record the same information in potable water log book.

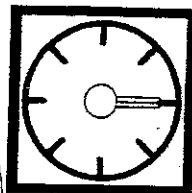
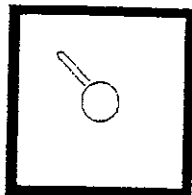
Resetting Air Conditioning

[Condition: Unit is off, alarm lights at either end of display are blinking]

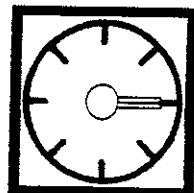
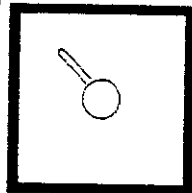
- 1) Push list button to show alarm fault
- 2) Acknowledge the alarms with ACKALL button
- 3) Check pressure on discharge side of the seawater pump to ensure the is cooling water
- 4) Restart compressor with RST FT button



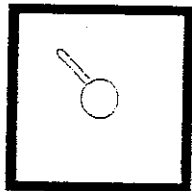
1
2



1
2



1
2



25	25	25
24	24	24
23	23	23
22	22	22

PUMP
CONTROL

19 19 19

autopilot
cont. 01

emergency
stop

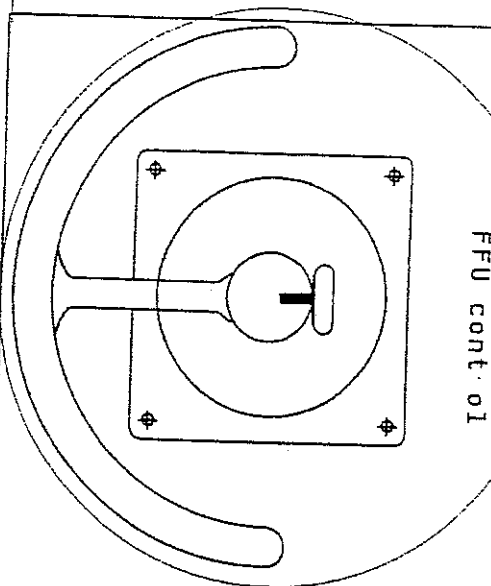


emergency
stop



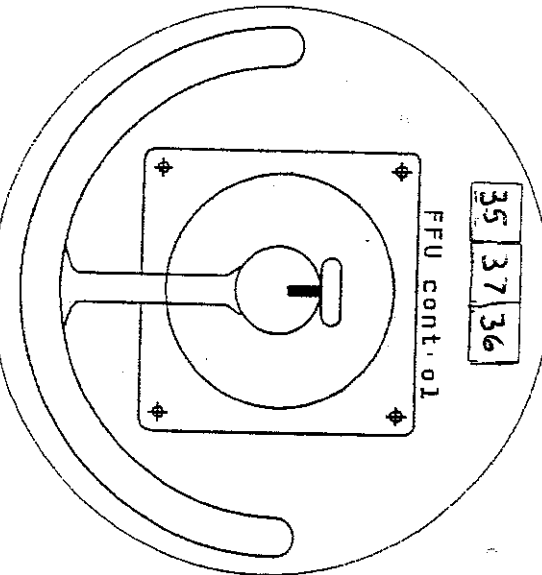
FFU cont. 01

37
35 36



35 37 36

FFU cont. 01



NFU cont. 01

26	27	26	27	26	27
----	----	----	----	----	----

38

3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6

DESK
CONTROL

30	30	30
32	32	32
31	31	31
33	33	33
34	34	34

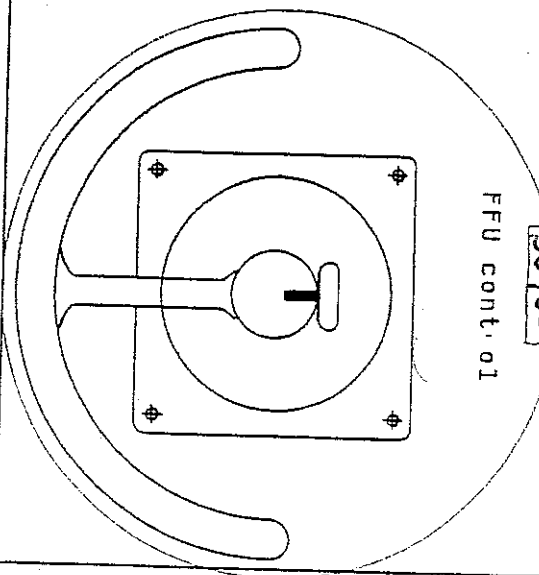
TAKE OVER
FROM MAIN

37
35 36

emergency
stop



FFU cont. 01



1 Instrument light dimmer
2 Lamp test
3 Control lamp for "EOS in Service"
4 Control lamp for "Main Desk in Service" (*Bridge*)
5 Control lamp for "Port Wing in Service"
6 Control lamp for "Stbd Wing in Service"
19 Control lamp for "Autopilot Mode" engaged
22 Push button with lamp for steering "Hydraulic Pump ON" (*P/S Z-Drives and Jet Pump*)
23 Push button with lamp for steering "Hydraulic Pump OFF" (*P/S Z-Drives and Jet Pump*)
24 Control lamp for "Hydraulic Pump Local Control" (EOS)
25 Control lamp for "Steering Motor Energized"
26 Push button with lamp for "thrust CW"
27 Push button with lamp for "thrust CCW"
30 Push button with lamp for "Send Control to Main Desk" (*Bridge*)
31 Control lamp for "Main Desk(*Bridge*) Send Control to EOS Desk"
32 Buzzer for "Main Desk(*Bridge*) Send Control to EOS Desk"
33 Push button with lamp for "Take Control From Main Desk" (*Bridge*)
34 Push button with lamp for "EMERGENCY TAKEOVER OF CONTROL TO EOS"
35 Control lamp for "FFU Steering in Service" (*If blinking, control must be synchronized with actual unit*)
36 Control lamp for "FFU RPM Control in Service" (*If blinking, control must be synchronized with actual unit*)
37 Lamp for "Summary Alarm SCHOTTEL Unit"
38 Push button with lamp for "SPJ Cleaning Mode"

EMPRESS OF THE NORTH

PRE UNDERWAY CHECKLIST

Generators

Lube Oil ☐
Coolant level ☐
Sea valves ☐
Starting air valves ☐

Z DRIVE STBD

Gear oil ☐
Hyd oil ☐
Hoses ☐
Motor brushes ☐
Sea valve ☐
Cooling pump ☐

Z DRIVE PORT

Gear oil ☐
Hyd oil ☐
Hoses ☐
Motor brushes ☐
Sea valve ☐
Cooling pump ☐

PADDLE WHEEL

Gear lube oil ☐
Visual inspection ☐

FUEL DAY TANKS

Check level ☐



Starting the plant.

1. Put the generator that is running in the Lead position on the Master Control Panel. (Move the Load Select Switch to the position of the generator running.)
2. Place another generator in AUTO.
3. Place the Auto/Manual selector switch in Auto on the Master Control Panel.
4. Verify that the power management system control is active on the HMI. (LLS/LAS on EOS console).
5. Close the z-drive, jet pump, and paddlewheel breakers.
6. The generator that is in auto and not running should start and parallel itself after a couple of minutes.
7. Start another generator in manual and parallel. There will then be 2 generators in auto and 1 in manual for maneuvering.
8. Start the steering pumps. Test directional control of units locally from the EOS.
9. Start the z-drives, jet pump, and paddlewheel. Test speed control locally from the EOS.
10. Transfer control to the bridge. The bridge should test steering and speed control on each before leaving the dock.

Securing the plant.

1. Take control from bridge.
2. Stop the z-drives, jet pump, and paddlewheel.
3. Secure the generator that is in manual. (Droop the load with the droop switch and open the breaker, then turn engine control to off.)
4. Open the z-drives, jet pump, and paddlewheel breakers.
5. The generator that is in auto should shut down after a couple of minutes.

Generators

-Bringing a 2nd gen online with Power Management (PM) enabled
[After preliminary check list for gens]

- a) Close Z-drive breakers/gen on stand-by with least amount of hours should come online.

Or

- b) Start gen in manual
 - bring gen online by closing breaker when synchroscope is at 1200
 - wait a minute for the PM3 relay to close and switch the gen from manual to auto
 - gen will stay online for about 5-10 min unless it is made lead gen or the Z-drive breakers are closed. Otherwise PM will take it offline and shut it down

**EMPRESS OF THE NORTH
EMERGENCY STEERING PROCEDURES
(ENGINEERING)**

-Upon discovering a steering failure, immediately notify the bridge and Chief Engineer.

-Start the jet pump and transfer to the bridge if not already done.

-Determine whether the steering pumps are on by checking the alarm panel and the Z-drive steering cabinets for any faults (red lamps).

: If pumps are off, inform bridge that you'll be taking control to try a restart, and if successful, return control to the bridge. Starting and stopping of the steering pumps can only be done when station has control. Control is established at station only when "steering pump off" or "steering pump on" lamps are lit.

: If pumps are on and the bridge has no control, coordinate with the bridge to steer from the EOS console.

-If NFU buttons on the console are lit up, the FFU card or system has failed and steering can be done with the NFU buttons.

-If steering needs to be done from EOS, maintain contact with the bridge through handheld radio, phone, or EOT.

Steering/Drives

-Enabling and transferring steering and drives

- 1) Turn steering pumps for Z-drives on at hydraulic control cabinets in lower engine room/ "hyd pump on" light will be on for each
- 2) Turn steering pump for jet pump on at EOS console
- 3) Close breakers for Z-drives, jet pump, and paddlewheel on 600 V panel
- 4) Ensure that at least 2 generators are online before starting drive units at EOS console/start drives
- 5) Test steering and throttles for Z-drives and jet pump
- 6) Transfer Z-drives and jet pump to "main" desk (bridge)/ paddlewheel control will follow the controls of the other drives to the bridge automatically

* "steering pump local control" lights for the Z-drive steering will be lit on the EOS console indicating that they can only be started and shut down from the hydraulic control cabinets in the lower engine room

Paralleling Generators

[After preliminary check list for gens]

- 1) Start gen by turning engine control switch to "man"
- 2) Let engine warm up for a few minutes
- 3) Turn synchroscope on/adjust speed control so that the synchroscope is turning CW slowly
- 4) When the synchroscope is at 1200, turn the breaker control switch to close
- 5) Check the load(kW, amps) to ensure the gen is online and load sharing with the other gens
- 6) Turn synchroscope off

Taking Generators Out of Parallel

[Only when gen is online in manual]

- 1) Flip the load shed toggle switch into the down position
- 2) When the kW meter is almost at "0", trip the breaker control switch
- 3) Turn engine control switch to the off position/flip load shed toggle back to the up position
- 4) Engine will cool down in the idle position and shut down automatically